Material Safety Data Sheet

Aqueous Urea Solution 32.5%

Section 1. Chemical product and company identification

Product name : Aqueous Urea Solution 32.5%

Supplier : AIRGAS INC., on behalf of its subsidiaries
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Synonym : Designation or trade mark: Automotive grade urea solution, AUS 32, AdBlue
TM

Material uses : SCR NOx Control

MSDS # : 008651

Date of Preparation/Revision : **4/10/2009.**

In case of emergency : 1-866-734-3438

Section 2. Hazards identification

Physical state : Liquid.

Emergency overview : Colorless liquid. With slight ammonia (pungent) odor. Reacts with sodium hypochlorite or calcium hypochlorite to form the explosive nitrogen trichloride. When heated, urea releases ammonia and when heated to decomposition it emits toxic fumes of nitrogen oxides (NOx), ammonia, and cyanuric acid. Use water to control fires involving urea solution if water is compatible with burning material. Urea solution itself is nonflammable.

CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Contains material that may cause target organ damage, based on animal data.

Target organs : Contains material which may cause damage to the following organs: skin, eye, lens or cornea.

Potential acute health effects

Eyes : No known significant effects or critical hazards.

Skin : No known significant effects or critical hazards.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : No known significant effects or critical hazards.

Potential chronic health effects : **CARCINOGENIC EFFECTS**: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

Section 3. Composition, Information on Ingredients

United States

			Exposure limits
water	7732-18-5	66.3 - 67.7	
urea	57-13-6	31.8 - 33.2	**AIHA WEEL (United States, 1/2007).** TWA: 10 mg/m³ 8 hour(s).
biuret	108-19-0	0.0001 - 0.3	
ammonia, anhydrous	7664-41-7	0.0001 - 0.2	**ACGIH TLV (United States, 1/2008).** STEL: 24 mg/m³ 15 minute(s). STEL: 35 ppm 15 minute(s).

TWA: 17 mg/m³ 8 hour(s).
TWA: 25 ppm 8 hour(s).

NIOSH REL (United States, 6/2008).
STEL: 27 mg/m³ 15 minute(s).
STEL: 35 ppm 15 minute(s).
TWA: 18 mg/m³ 10 hour(s).
TWA: 25 ppm 10 hour(s).

OSHA PEL (United States, 11/2006).
TWA: 35 mg/m³ 8 hour(s).
TWA: 50 ppm 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).
STEL: 27 mg/m³ 15 minute(s).
STEL: 35 ppm 15 minute(s).

Section 4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Section 5. Fire-fighting measures

Flammability of the product : Non-flammable.

Not applicable.

Products of combustion : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

In a fire or if heated, a pressure increase will occur and the container may burst.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Personal protection in case of a large spill : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product.

Product name	Exposure limits
United States	

water
urea

AIHA WEEL (United States, 1/2007).
TWA: 10 mg/m³ 8 hour(s).

biuret
ammonia, anhydrous

ACGIH TLV (United States, 1/2008).
STEL: 24 mg/m³ 15 minute(s).
STEL: 35 ppm 15 minute(s).
TWA: 17 mg/m³ 8 hour(s).
TWA: 25 ppm 8 hour(s).
NIOSH REL (United States, 6/2008).
STEL: 27 mg/m³ 15 minute(s).
STEL: 35 ppm 15 minute(s).
TWA: 18 mg/m³ 10 hour(s).
TWA: 25 ppm 10 hour(s).
OSHA PEL (United States, 11/2006).
TWA: 35 mg/m³ 8 hour(s).
TWA: 50 ppm 8 hour(s).
OSHA PEL 1989 (United States, 3/1989).
STEL: 27 mg/m³ 15 minute(s).
STEL: 35 ppm 15 minute(s).

Section 9. Physical and chemical properties

Physical state : Liquid.

Color : Colorless.

Odor : ammonia (pungent) [Slight]

pH : 9.5

Boiling/condensation point : Lowest known value: 100°C (212°F) (water).

Melting/freezing point : May start to solidify at the following temperature: 0°C (32°F) This is based on data for the following ingredient: water.

Specific gravity : Only known value: 1 (Water = 1) (water).

VOC : 0 % (w/w)

Section 10. Stability and reactivity

Stability and reactivity : The product is stable.

Incompatibility with various substances : Extremely reactive or incompatible with the following materials: oxidizing materials. Highly reactive or incompatible with the following materials: metals.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Product/ingredient name	Result	Species	Dose	Exposure
water	LD50 Oral	Rat	>90 mL/kg	-
urea	LD50 Intraperitoneal	Rat	>5 g/kg	-
	LD50 Intratracheal	Rat	567 mg/kg	-
	LD50 Intravenous	Rat	5300 mg/kg	-
	LD50 Oral	Rat	8471 mg/kg	-
	LD50 Subcutaneous	Rat	8200 mg/kg	-
ammonia, anhydrous	LC50 Inhalation Vapor	Rat	7040 mg/m3	30 minutes
	LC50 Inhalation Vapor	Rat	18600 mg/m3	5 minutes
	LC50 Inhalation Gas.	Rat	9500 ppm	1 hours
	LC50 Inhalation Gas.	Mouse	4230 ppm	1 hours
	LC50 Inhalation Gas.	Rat	2000 ppm	1 hours
	LC50 Inhalation	Rat	2000 ppm	4 hours

Gas.			
LC50 Inhalation Gas.	Rat	17401 ppm	15 minutes

Chronic effects on humans : Contains material which may cause damage to the following organs: skin, eye, lens or cornea.

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material to humans.

Specific effects

Carcinogenic effects : No known significant effects or critical hazards.

Mutagenic effects : No known significant effects or critical hazards.

Reproduction toxicity : No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

urea	-	Acute EC50 6573.1 to 7061 mg/L Fresh water	Daphnia - Water flea - Ceriodaphnia dubia	48 hours
	-	Acute EC50 3910000 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
	-	Acute LC50 83700 to 86900 ug/L Fresh water	Fish - Rohu - Labeo rohita	96 hours
	-	Acute LC50 72600 to 75900 ug/L Fresh water	Fish - Rohu - Labeo rohita	96 hours
	-	Acute LC50 66800 to 70500 ug/L Fresh water	Fish - Rohu - Labeo rohita	96 hours
	-	Acute LC50 65800 to 70200 ug/L Fresh water	Fish - Rohu - Labeo rohita	96 hours
	-	Acute LC50 64700 to 69200 ug/L Fresh water	Fish - Rohu - Labeo rohita	96 hours
	-	Acute LC50 23400 to 26500 ug/L Fresh water	Fish - Rohu - Labeo rohita	96 hours
	-	Acute LC50 22500 ug/L	Fish - Mozambique tilapia - Tilapia mossambica	96 hours
	-	Acute LC50 16700 to 19600 ug/L Fresh water	Fish - Rohu - Labeo rohita	96 hours
	-	Acute LC50 90100 to 93900 ug/L Fresh water	Fish - Rohu - Labeo rohita	96 hours
	-	Acute LC50 5000 ug/L Fresh water	Fish - Giant gourami - Colisa fasciata	96 hours
ammonia, anhydrous	-	Acute LC50 1.17 mg/L Fresh water	Fish - Bluegill - Lepomis macrochirus	96 hours
	-	Acute LC50 0.88 mg/L Fresh water	Fish - Orangethroat darter - Etheostoma spectabile	96 hours
	-	Acute LC50 0.74 mg/L Fresh water	Fish - Orangethroat darter - Etheostoma spectabile	96 hours
	-	Acute LC50 16010 to 21460 ug/L Marine water	Crustaceans - Kuruma shrimp - Penaeus japonicus - Mysis	48 hours
	-	Acute LC50 14860 to	Crustaceans -	48 hours

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	19140 ug/L Marine water	Redtail prawn - Penaeus penicillatus - Zoea	
-	Acute LC50 14530 to 20600 ug/L Marine water	Crustaceans - San paulo shrimp - Penaeus paulensis - Zoea	48 hours
-	Acute LC50 11310 to 15480 ug/L Marine water	Crustaceans - Kuruma shrimp - Penaeus japonicus - Zoea	48 hours
-	Acute LC50 8590 to 9640 ug/L Marine water	Crustaceans - San paulo shrimp - Penaeus paulensis - Post-larvae	48 hours
-	Acute LC50 5210 to 6040 ug/L Marine water	Crustaceans - Redtail prawn - Penaeus penicillatus - Zoea	48 hours
-	Acute LC50 4980 to 9070 ug/L Marine water	Crustaceans - Kuruma shrimp - Penaeus japonicus - Nauplii	48 hours
-	Acute LC50 4180 to 6030 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - <24 hours	48 hours
-	Acute LC50 4130 to 5100 ug/L Fresh water	Daphnia - Water flea - Daphnia pulex - <24 hours	48 hours
-	Acute LC50 2710 to 3670 ug/L Fresh water	Daphnia - Water flea - Ceriodaphnia reticulata - <4 hours	48 hours
-	Acute LC50 2500 ug/L Fresh water	Crustaceans - Aquatic sowbug - Asellus aquaticus - 8 to 10 mm	48 hours
-	Acute LC50 1600 to 1730 ug/L Fresh water	Fish - Common jollytail - Galaxias maculatus - Juvenile (Fledgling, Hatchling, Weanling) - 42 to 62 mm - 0.4 to 1.3 g	96 hours
-	Acute LC50 1550 ug/L Fresh water	Fish - Common jollytail - Galaxias maculatus - Juvenile (Fledgling, Hatchling, Weanling) - 42 to 62 mm - 0.4 to 1.3 g	96 hours
-	Acute LC50 660 ug/L Fresh water	Fish - Cyprinus carpio	96 hours
-	Acute LC50 450 to 470 ug/L Fresh water	Fish - Chinook salmon -	96 hours

		Oncorhynchus tshawytscha - Underyearling - 1 to 7 g	
-	Acute LC50 440 ug/L Fresh water	Fish - Cyprinus carpio	96 hours
-	Acute LC50 380 ug/L Fresh water	Fish - Silver carp - Hypophthalmichthys molitrix - Fingerling	96 hours
-	Acute LC50 300 ug/L Fresh water	Fish - Carp - Hypophthalmichthys nobilis	96 hours
-	Acute LC50 31260 ug/L Marine water	Crustaceans - Redtail prawn - Penaeus penicillatus - 3.58 to 4.75 cm - 0.4 to 0.69 g	48 hours
-	Acute LC50 25400 ug/L Fresh water	Daphnia - Water flea - Daphnia magna	48 hours
-	Acute LC50 22790 to 32200 ug/L Marine water	Crustaceans - Kuruma shrimp - Penaeus japonicus - Post-larvae	48 hours

Products of degradation : Products of degradation: carbon oxides (CO, CO_2) and water, nitrogen oxides (NO, NO_2 etc.).

Section 13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation.Return cylinders with residual product to Airgas, Inc.Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	Not regulated.	-	-	-		-
TDG Classification	Not regulated.	-	-	-		-
Mexico Classification	Not regulated.	-	-	-		-

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"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Section 15. Regulatory information

United States

HCS Classification : Target organ effects

U.S. Federal regulations : TSCA 4(a) final test rules: biuret
United States inventory (TSCA 8b): All components are listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: urea
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: urea: Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: No products were found.

Clean Water Act (CWA) 311: ammonia, anhydrous

Clean Air Act (CAA) 112 accidental release prevention: ammonia, anhydrous

Clean Air Act (CAA) 112 regulated flammable substances: No products were found.

Clean Air Act (CAA) 112 regulated toxic substances: ammonia, anhydrous

State regulations : **Connecticut Carcinogen Reporting:** None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: None of the components are listed.
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: None of the components are listed.
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: None of the components are listed.
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: None of the components are listed.
Rhode Island Hazardous Substances: None of the components are listed.

Canada

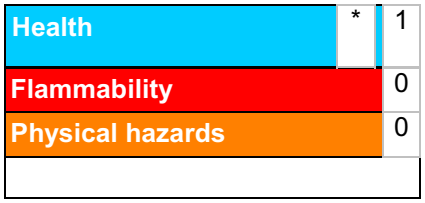
WHMIS (Canada) : Not controlled under WHMIS (Canada).

CEPA Toxic substances: None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: None of the components are listed.
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Section 16. Other information

Label requirements : CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.) :



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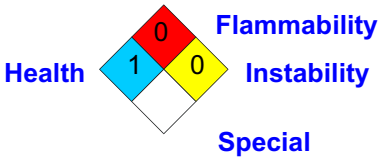
National Fire Protection Association (U.S.A.) :



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.